point in time during the deposition process for any given temperature. In other words, calibration relating hydrogen partial pressure to germane gas flow rates allows conversion of hydrogen partial pressure variation with time to germane flow rate variation with time and, in turn, SiGe alloy film thickness and percentage germanium in the SiGe alloy at any given point in time is a direct function of hydrogen partial pressure. It should also be appreciated from Figure 5 that hydrogen evolution is especially sensitive to the concentration of germanium at the deposition surface and thus to the amount of germanium incorporated in the SiGe alloy film.

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As a practical matter, the calibration can potentially be complicated by several factors. For example, some hydrogen evolution will be due to deposition of silicon or SiGe alloy on polycrystalline silicon which may be present on the interior of the reactor vessel in which the deposition is performed. However, as noted above, film deposition on polysilicon proceeds much more slowly than deposition on monocrystalline silicon and the hydrogen evolution due to deposition on polysilicon will generally be manifested as a low level background partial pressure which will be specific to the reactor vessel. Therefore, calibration as described above which is directed to variation in hydrogen partial pressure with variation in other process parameters is generally sufficient to avoid causing significant errors in germanium percentage or temperature determination and silicon film thickness.